



The Indiana Fluvial Erosion Hazard Mitigation Project

Operation Stay Afloat 2012
Embrace the Realities – Envision the Possibilities
Indiana Government Center
March 15, 2012

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IUPUI

Federal and National Partners



FEMA



Many Agencies



One Solution

State, Local, and Educational Partners



In Cooperation with the Federal Emergency Management Agency and the
Indiana Department of Natural Resources, Division of Water

Flood of June 7–9, 2008, in Central and Southern Indiana

In June 2008, flooding damaged or destroyed more than 650 sections of road, 60 bridges, and 100 culverts in Indiana.



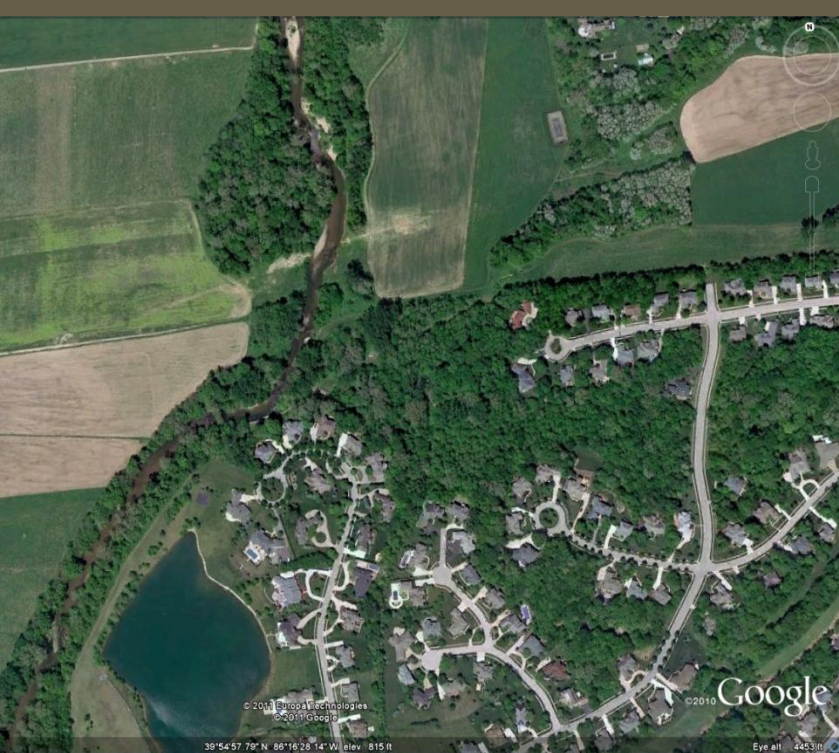
Open-File Report 2008–1322

U.S. Department of the Interior
U.S. Geological Survey



Unnamed tributary to White River at Keystone Ave., Indianapolis

June, 2011



Eagle Creek, near Zionsville, IN

Whitewater River near Brookville, IN

2006



2008



Distance in 2006 = 1846 feet

Distance in 2008 = 1812 feet

34 foot change/ 2 years



Levee Road, Franklin County, IN

May, 2011

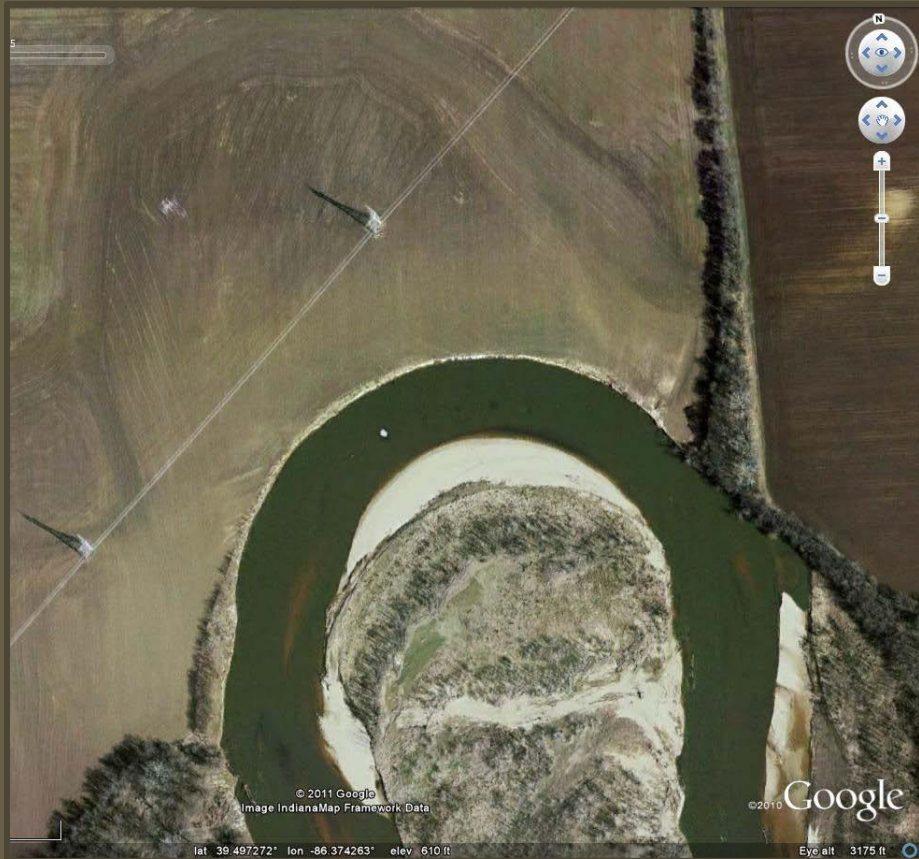


Levee Road, Franklin County, IN

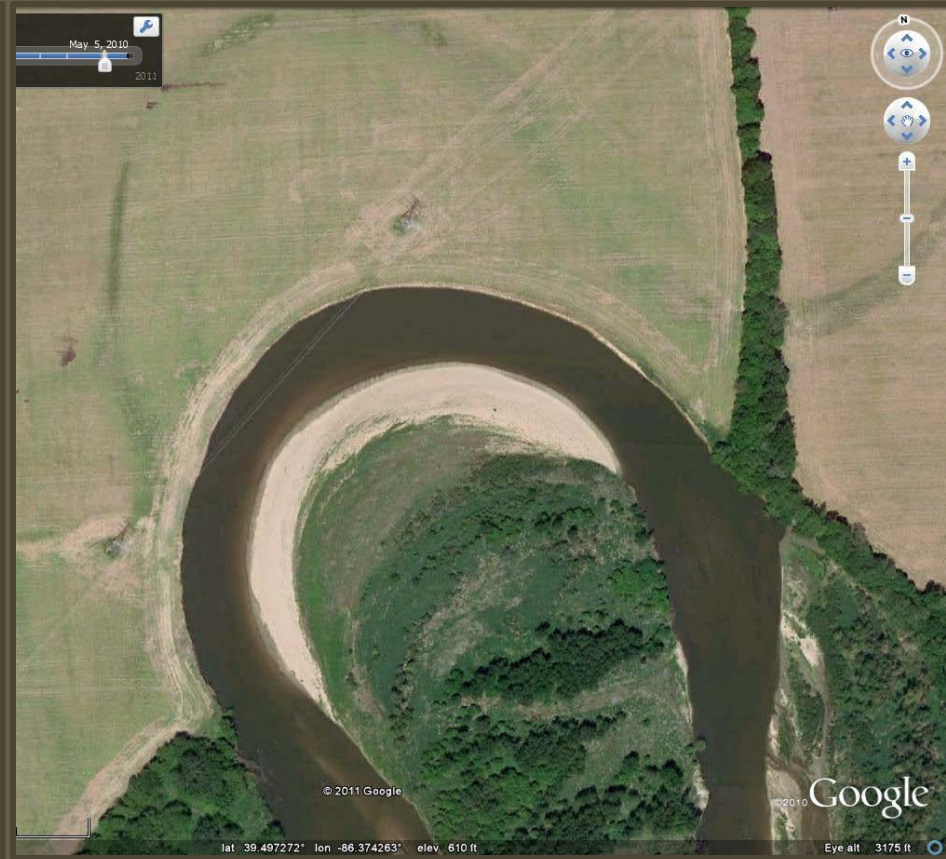
Robinson, August 2011

White River above Centerton, Ind.

March, 2005

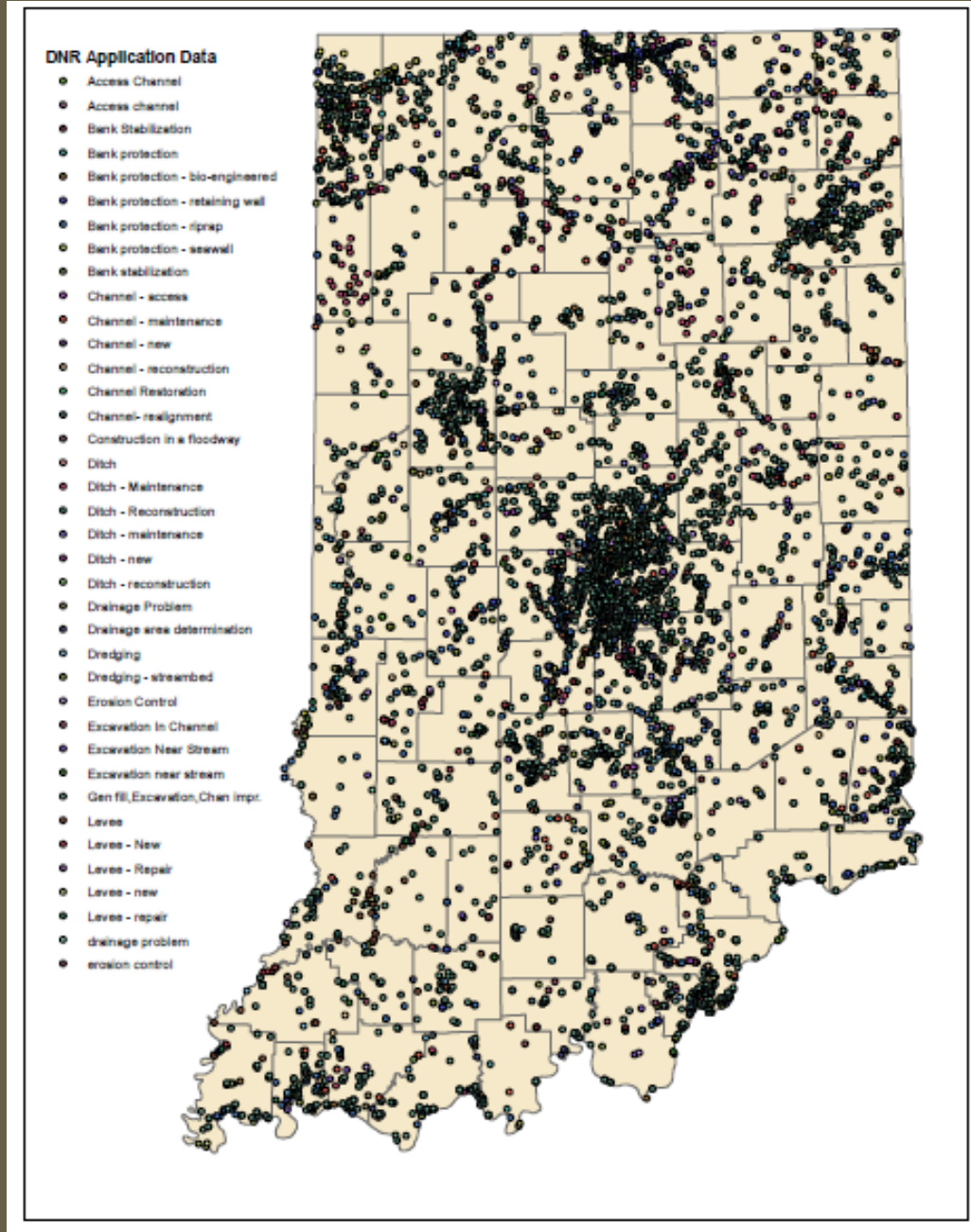


May, 2010



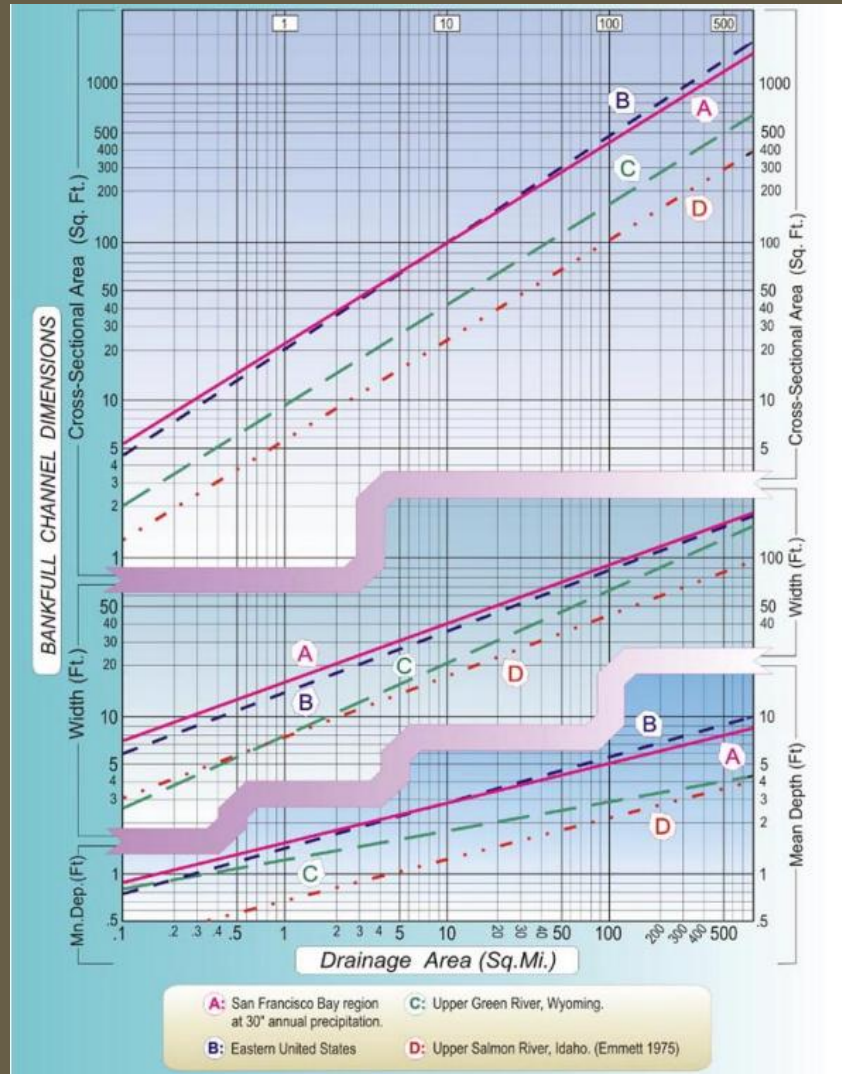
Moved 290 ft in 5 years (58 ft/yr)

Indiana Department of Natural Resources, Stream Permit Locations



Regional Hydraulic Geometry Curves

Bankfull Channel Dimensions for Non-urban Wadeable Streams in Indiana, SIR 2014-xxxx
(Robinson and Barr)



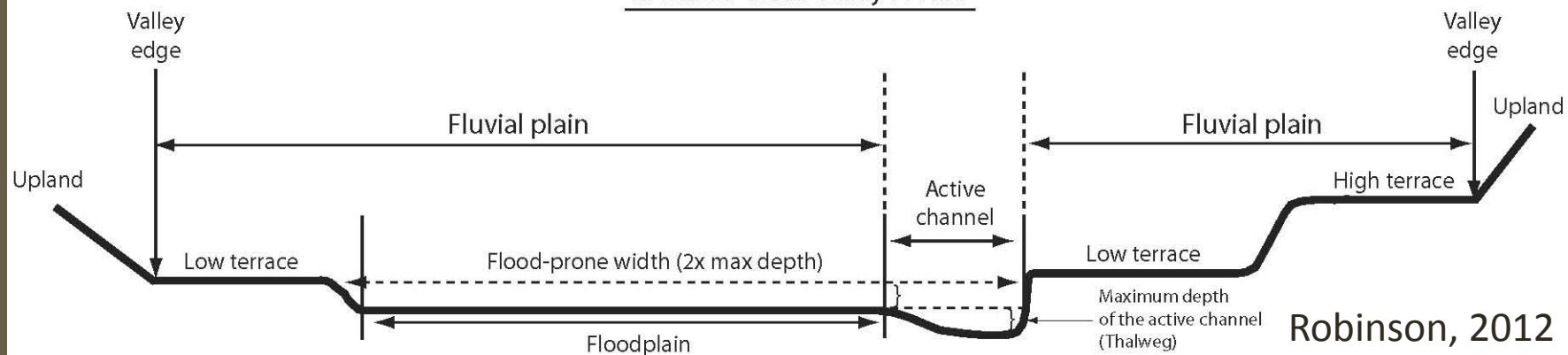
Drainage Area vs:

- Bankfull Width
- Bankfull Depth
- Cross-sectional Area

Regional curves showing bankfull dimensions vs drainage areas for various hydro-physiographic provinces (Dunn and Leopold, 1978).



Idealized Cross-Valley Profile



Photographic Guide to Bankfull Indicators

Patterned after USDA / USFS DVD-ROM



FEH Mapping

Patterned after Vermont DEC



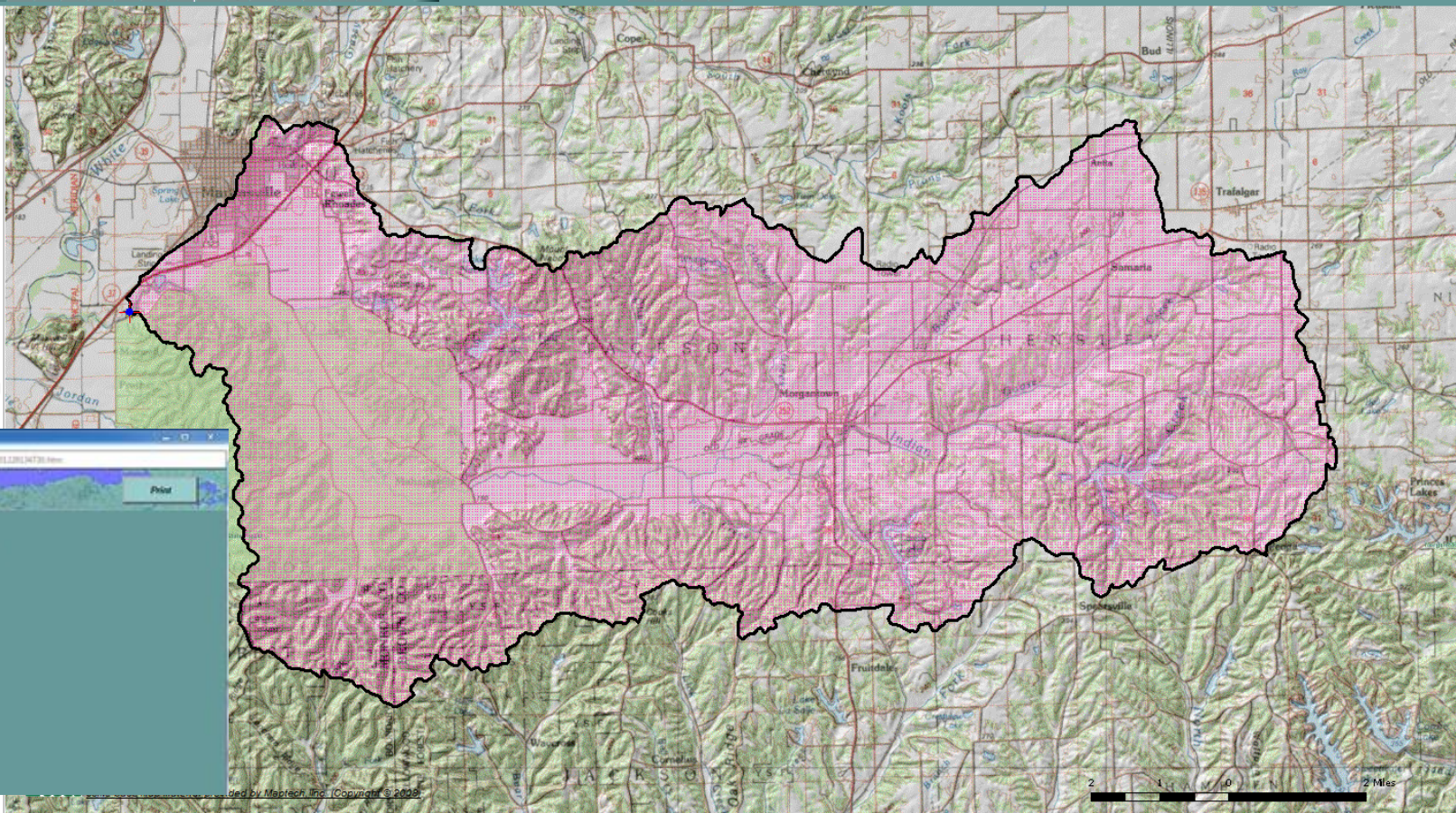
Indian Creek, Morgan County, IN



Indiana StreamStats



- Results >>
- Map Contents >>
- Navigation >>
- Overview >>



Indiana StreamStats

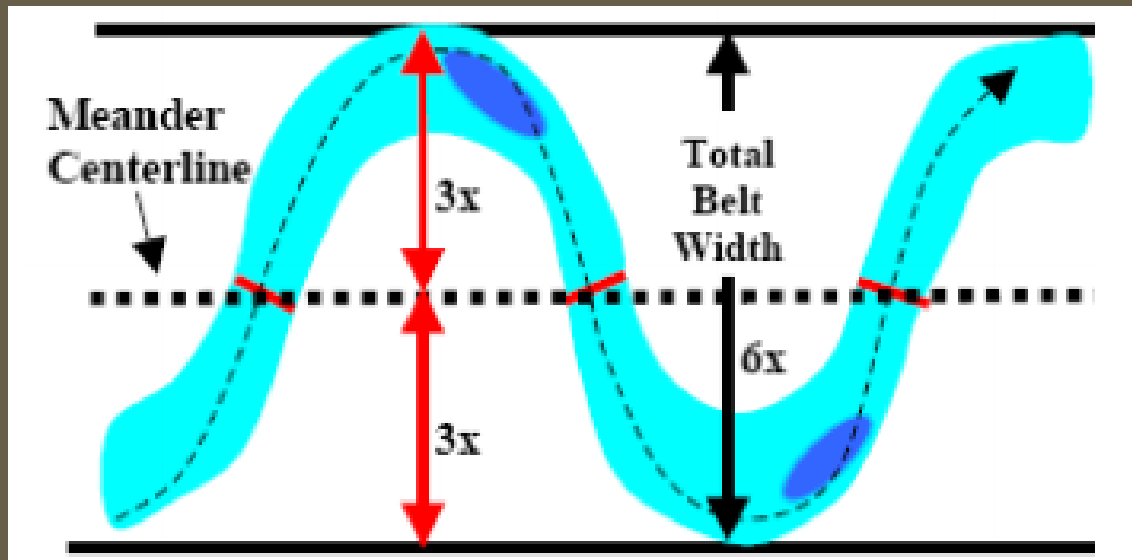
Basin Characteristics Report

Date: Wed Feb 8 2012 13:47:30 Mountain Standard Time
 NAD27 Latitude: 39.3959 (39 23 45)
 NAD27 Longitude: -86.4516 (-86 27 06)
 NAD83 Latitude: 39.3959 (39 23 45)
 NAD83 Longitude: -86.4516 (-86 27 06)

Parameter	Value
Channel 10-45 slope in feet per mile	9.57
Contributing drainage area in square miles	92.041
Region number	1508
Percent of area covered by water and wetland	1.5
Total drainage area in square miles	93.041
Percent of area covered by urban land cover	2.21



DA from USGS Streamstats = 92 mi² Wbkf predicted using Ohio Regional Curves = 90 ft
 Meander belt width = 540 ft (6 X 90 ft Wbkf)



Outer meander belt lines of a low gradient, meandering channel

Meander belt width approx 6X Bkf channel width

Exceptions to the 6X channel width occur in steep, narrow valleys with resistant materials, or in more sensitive areas that require >6X



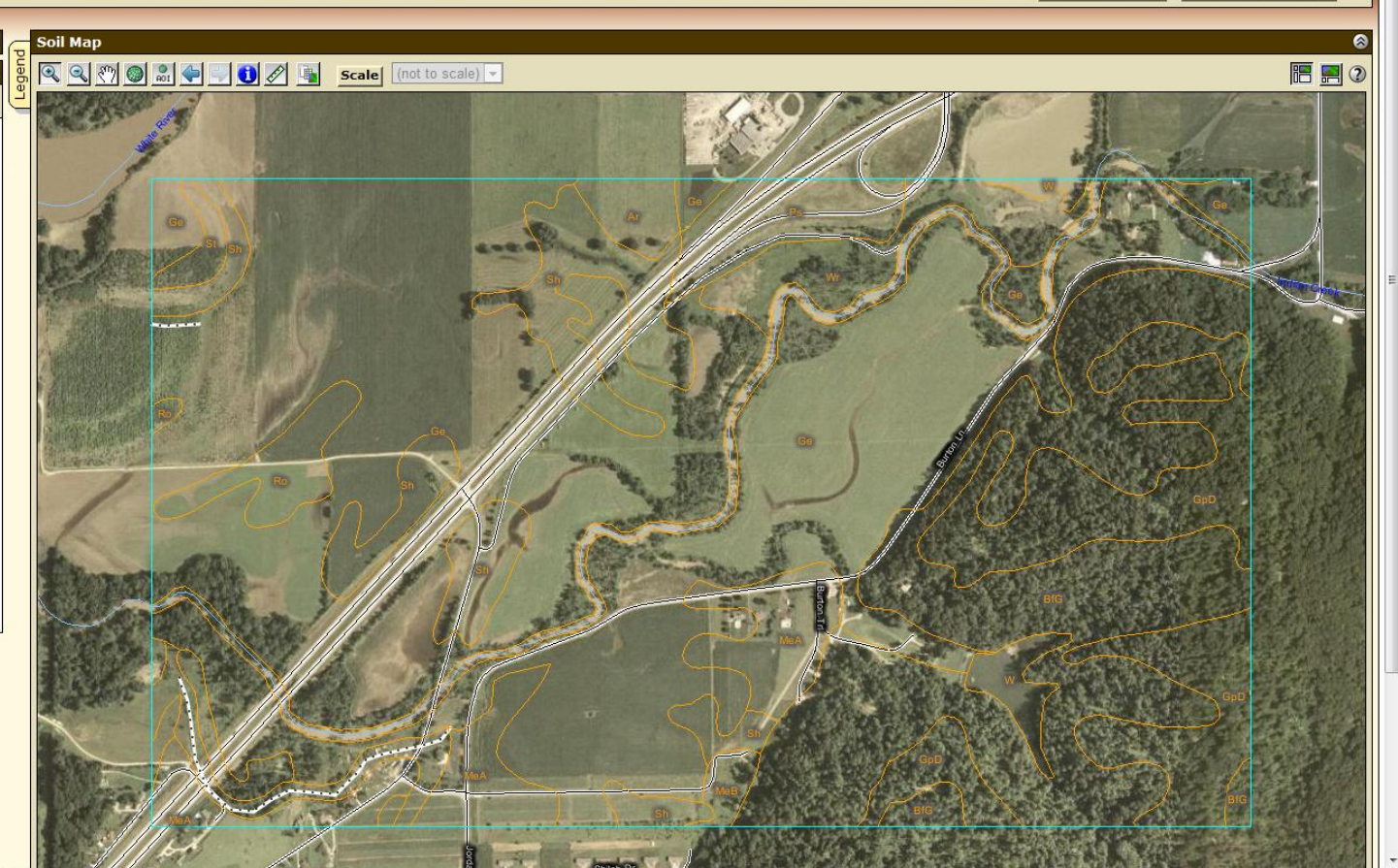
Indian Creek, Morgan County, IN

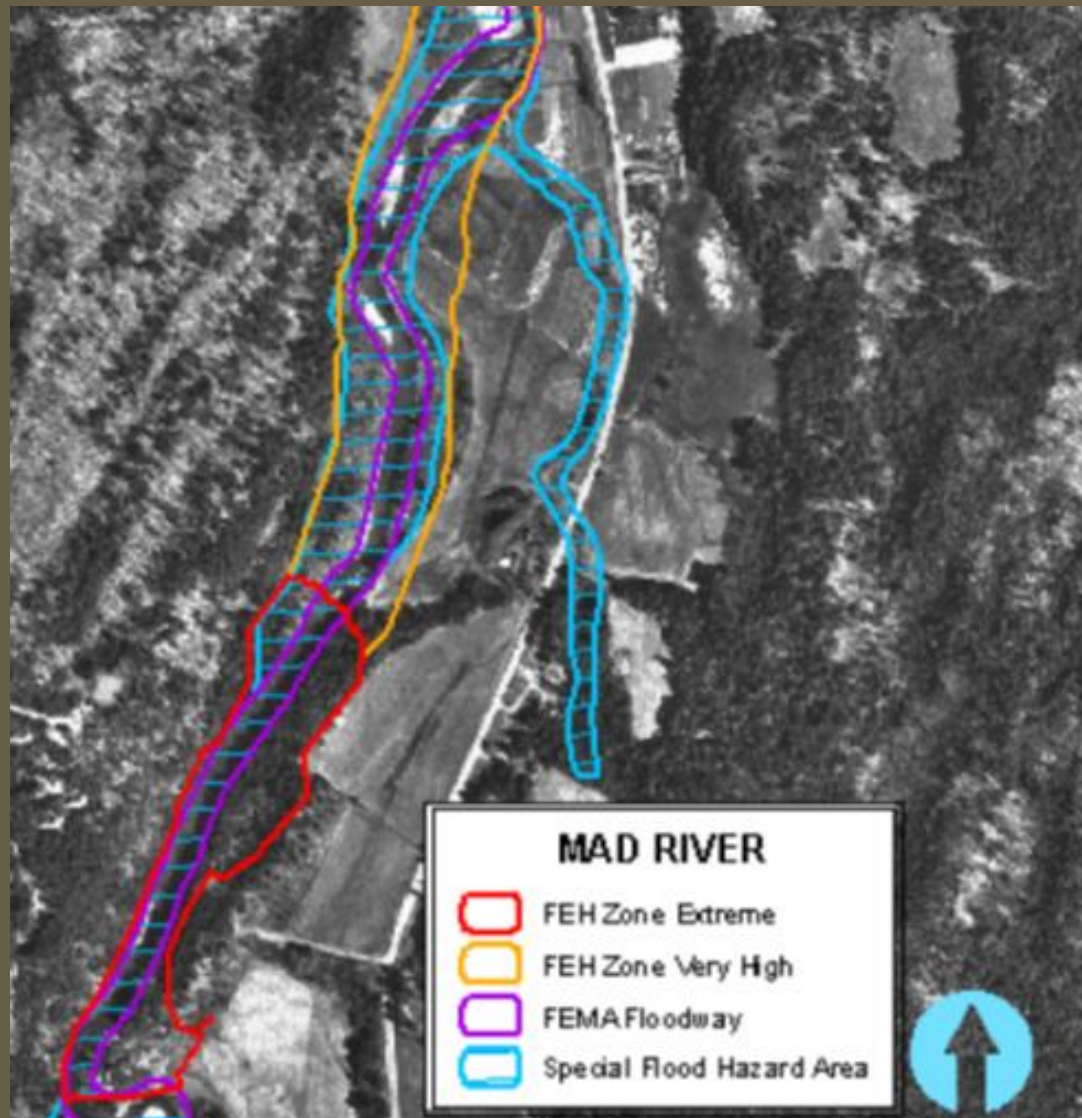
Search

Map Unit Legend

Morgan County, Indiana (IN109)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ar	Armiesburg silty clay loam	5.2	0.8%
BfG	Berks channery silt loam, 35 to 80 percent slopes	105.7	17.1%
Ge	Genesee silt loam	301.7	48.7%
GpD	Gilpin silt loam, 12 to 18 percent slopes	54.6	8.8%
MeA	Martinsville loam, 0 to 2 percent slopes	30.1	4.9%
MeB	Martinsville loam, 2 to 6 percent slopes	11.2	1.8%
Ps	Pits	13.4	2.2%
Ro	Ross loam	9.5	1.5%
Sh	Shoals silt loam	45.5	7.3%
St	Stonelick sandy loam	3.0	0.5%
W	Water	21.8	3.5%
Wr	Whitaker loam	18.0	2.9%
Totals for Area of Interest		619.5	100.0%





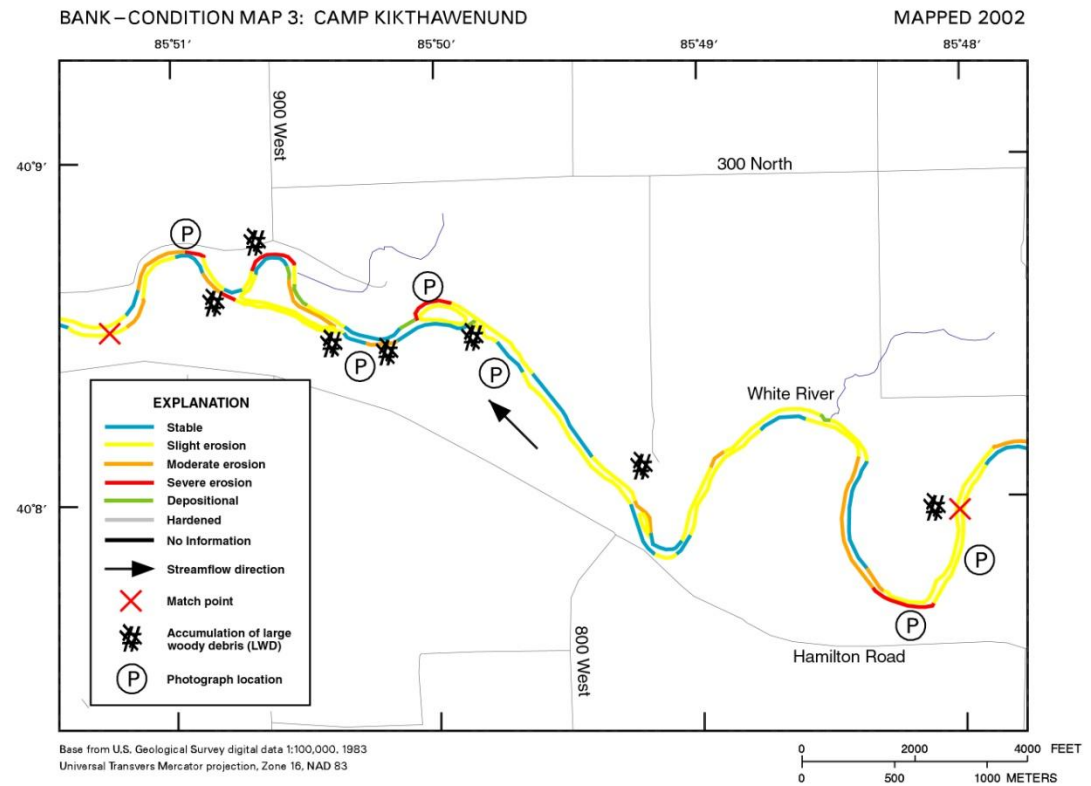
Vermont River Management Program

Bank-Stability Assessment Tool

Based on OFR 03-186, Robinson, White River...

Field Criteria

- Bank height
- Bank material
- Bank angle
- Vegetation condition
- Meander position





Cross Creek G. C., Adams County, IN

Robinson, 2012



Pleasant Run, Indianapolis, IN

Robinson, 2009



Cane Creek, Dubois County, IN

2012

Bridge-Screening Tool

Based on USGS Level 1 bridge-scour methods (1990s)

- Bank material
- Bank stability
- Bed material
- Flow alignment
- Piers in water
- Woody debris
- Observed scour





Troy Avenue Bridge, Buck Creek

Robinson, 1990

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Developing a Fluvial Erosion Hazard Mitigation Component for Indiana's State Hazard Mitigation Plan

Indiana's Fluvial Erosion Hazard (FEH) Program:

The Indiana Silver Jackets Hazard Mitigation Task Force has initiated a multi-agency program to identify, study, and provide mitigation planning resources for individuals and communities who would like to adopt FEH avoidance strategies. The resources provided by this project will enable individuals and communities to better recognize areas prone to natural stream-erosion processes and adopt strategies to avoid FEH-related risks.



An Indiana Silver Jackets Initiative to Protect Indiana Communities through Interagency Cooperation



Web portal: <http://www.indianafeh.polis.iupui.edu>



Indian Creek, Morgantown, IN

Robinson, 2009